

**EPA Superfund  
Record of Decision:**

**ROBINS AIR FORCE BASE (LANDFILL #4/SLUDGE  
LAGOON)  
EPA ID: GA1570024330  
OU 03  
HOUSTON COUNTY, GA  
09/25/1995**

U.S. Air Force  
Installation Restoration Program

Superfund  
Interim Action Record of Decision

Robins AFB Zone 1, Georgia  
Operable Unit 3  
Groundwater

August 3, 1995

Submitted by:  
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U.S. Department of Energy

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**Declaration for the Interim Action  
Record of Decision**

**Site Name and Address**

Zone 1, Robins Air Force Base  
Operable Unit 3, Groundwater  
Warner Robins, Houston County, Georgia

**Statement of Purpose**

This Interim Action Record of Decision (Irod) presents the selected interim remedial action for Operable Unit 3 of the Zone 1 Robins Air Force Base (AFB) Site, developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record that is on file in the Directorate of Environmental Management Office, Building 300, Robins AFB, Georgia 31098.

This interim remedial action is taken to protect human health and the environment while final remedial solutions are being developed.

**Assessment of the Site**

Actual or threatened releases of hazardous substances from Zone 1, if not addressed by implementing the response action selected in this Irod, may present an imminent and substantial endangerment to the public health or welfare or to the environment.

**Description of the Selected Interim Remedy**

The Zone 1 Robins AFB site is divided into three operable units. Operable Unit 1 addresses Landfill No. 4, the sludge lagoon, and the groundwater immediately adjacent to the lagoon and comprises source control. Operable Unit 2 addresses neighboring wetlands and surface waters, and Operable Unit 3 addresses the remaining groundwater beneath and adjacent to Landfill No. 4 and the sludge lagoon. The scope of this Irod is limited to Operable Unit 3.

The selected interim remedy for Operable Unit 3, groundwater, includes the following:

- Extraction of groundwater from at least two wells at the toe of Landfill No. 4.
- Treatment of the extracted groundwater in a new treatment system that can meet standards for discharge to the Ocmulgee River.
- Discharge of the treated effluent to the Ocmulgee River under a revised National Pollutant Discharge Elimination System (NPDES) permit.

## Statutory Determinations

This interim action is protective of human health and the environment, complies with Federal and State applicable or relevant and appropriate requirements (ARARs) for this limited-scope action, and is cost-effective. Although this interim action is not intended to address fully the statutory mandate for permanence and treatment to the maximum extent practicable, this interim action does utilize treatment and thus is in furtherance of that statutory mandate. Because this interim action does not constitute the final remedy for the operable unit, the statutory preference for remedies that use treatment that reduces toxicity, mobility, or volume as a principal element, although partially addressed in this interim remedy, will be addressed by the final response action. Subsequent actions are planned to address fully the threats posed by the conditions at this operable unit. Because this interim remedy will result in hazardous substances remaining on the site above health-based levels, a review will be conducted to ensure that the interim remedy continues to provide adequate protection of human health and the environment within five years after commencement of the remedial action. Because this is an IROD, review of this site and of this interim remedy will be ongoing as Robins Air Force Base continues to develop final remedial alternatives for the operable unit.

<IMG SRC 0495258>

23 August 1995

EUGENE L. TATTINI, Maj. Gen, USAF  
Acting Commander  
Air Force Materiel Command

## **Decision Summary**

### **1.0 Site Name, Location, and Description**

Robins AFB is an active facility occupying 8,855 acres approximately 18 miles south of Macon, Georgia (Figure 1-1). Robins AFB is bounded on the west by the City of Warner Robins, on the north by a housing subdivision in Houston County, on the south by unincorporated Bonaire, and on the east by the Ocmulgee River and its floodplain.

The Zone 1, Robins AFB, National Priority List (NPL) site is located approximately 4,500 feet east of Georgia Highway 247 in the central part of the base (Figure 1-2). Zone 1 consists of Landfill No. 4, which covers 45 acres, and the adjacent 1.5-acre sludge lagoon (Figure 1-2).

Zone 1 is adjacent to a bluff that forms the western boundary of the Ocmulgee River floodplain. The floodplain extends about 1 to 2 miles eastward to the river. Landfill No. 4 originally was constructed by disposing of fill material into the floodplain and wetland area from the bluff and advancing to the east. The sludge lagoon was constructed on the northern boundary of Landfill No. 4 by excavating and building earthen dikes. Surface water at Robins AFB generally drains from west to east into the Ocmulgee River floodplain.

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### **2.0 Site History and Enforcement Activities**

Robins AFB serves as a worldwide logistics management center for aircraft, missiles, and support systems and is a major repair center for aircraft and airborne electronic systems.

Robins AFB has generated various types of solid waste over the years, including refuse and hazardous waste. The hazardous waste includes electroplating waste containing heavy metals and cyanide, organic solvents from cleaning operations and fire training exercises, and off-specification chemicals, such as pesticides.

In 1982, Robins AFB conducted a basewide survey to identify and assess past practices for disposing of hazardous waste. Disposal areas were grouped into eight zones that were based primarily on location and type of disposal activity. Zone 1 (Landfill No. 4 and the sludge lagoon) was considered to have the highest potential for migration of hazardous substances and as a result was placed on the CERCLA NPL by the U.S. Environmental Protection Agency (EPA) in 1987. Landfill No. 4 reportedly operated from 1965 to 1978 for disposing of general refuse and industrial wastes. The sludge lagoon was used for disposing of sludge from the industrial wastewater treatment plant and other liquid waste from 1962 to 1978. Both the landfill and the sludge lagoon were closed and covered with clean fill in 1978.

In June 1989, Robins AFB entered into a Federal Facilities Agreement with the Georgia Environmental Protection Division (GEPD) and EPA to establish a procedural framework and a schedule for developing, implementing, and monitoring appropriate response actions at the site in accordance with CERCLA, the NCP, Superfund guidance and policy, and the Georgia Hazardous Waste Management Act (GHWMA).

From 1991 to 1994, there were several disputes concerning the ARARs for the groundwater at Zone 1. These disputes eventually led to the February 28, 1994, Dispute Resolution of Initial Screening of Alternatives (ISA) for Operable Unit 3. The ISA defined the groundwater point of compliance as Hannah Road, and the interim remedial goals as maximum contaminant levels (MCLs)

and nonzero maximum contaminant level goals (MCLGs) for the Blufftown and Providence Aquifers and as ambient water quality criteria (AWQC) for the Quaternary Aquifer.

The following reports describe the results of investigations at Zone 1, Operable Unit 3, to date:

HAZWRAP. U.S. Air Force Installation Restoration Program. Remedial Investigation Zone 1, Additional Site Investigations at Zones 1 and 5, Task S2 Report. Robins AFB, Georgia. November 1988.

HAZWRAP. U.S. Air Force Installation Restoration Program. Remedial Investigation Zone 1. Robins AFB, Georgia. May 1990.

HAZWRAP. U.S. Air Force Installation Restoration Program. Feasibility Study, Landfill No. 4 and Sludge Lagoon Source Control, Operable Unit 1, Zone 1. Robins AFB, Georgia. February 1991.

HAZWRAP. U.S. Air Force Installation Restoration Program. Remedial Investigation Report, Zone 1, Operable Unit 3: Groundwater. Robins AFB, Georgia. September 1993.

HAZWRAP. U.S. Air Force Installation Restoration Program. Feasibility Study, Groundwater, Operable Unit 3, Zone 1. Robins AFB, Georgia. February 1995.

### **3.0 Highlights of Community Participation**

Community relations activities that have taken place at Robins AFB to date include the following:

- Federal Facility Agreement (FFA) process. After the FFA was prepared by the Air Force, EPA Region IV, and the State, the document was published for comment.
- Administrative Record/Information Repository. The Administrative Record has been established in Building 300 on Robins AFB and is maintained by the remedial project manager (RPM). The Environmental Information Repository has been established at the Nola Brantley Memorial Library, 721 Watson Boulevard, Warner Robins, Georgia, and in Building 300. The Building 300 repository contains information used to support Air Force decision-making and is accessible through the Robins AFB Public Affairs Office.
- Community Relations Plan (CRP). The CRP was updated in August 1992 and is presently being revised. The CRP is being implemented by Public Affairs in coordination with the Air Force RPM. The CRP provides the strategy and guidelines for open communication between the public, regulatory officials, and Air Force officials.
- Restoration Advisory Board (RAB). The Technical Review Committee (TRC) is being replaced by the RAB, which has representatives from the Air Force, EPA Region IV, Georgia EPD, U.S. Fish and Wildlife Service, and the National Oceanic and Atmospheric Administration. The RAB also includes representatives from the City of Warner Robins Department of Community Development, the Houston County Emergency Management Agency (HEMA), and the surrounding local communities.
- Mailing List. A mailing list of interested parties in the community is maintained by the installation and is updated regularly.
- Newsletter. A quarterly newsletter describing the status of the IRP at the

installation was last distributed to the mailing list in December 1994. Information related to Zone 1 occasionally appears in the newsletter.

- Television. The "Robins Report" is a 15-minute weekly television program broadcast locally. Environmental subjects are addressed periodically. Information related to Zone 1 occasionally appears in the "Robins Report."

#### **4.0 Scope and Role of Operable Unit 3**

Zone 1 is divided into three operable units (OUs). OUs typically are developed to better focus on areas of contamination that are within the same geographic area or to focus on a particular medium, such as groundwater.

OU3 activities address the eastward-migrating contaminated groundwater in Zone 1, other than the groundwater below the sludge lagoon, so that interim cleanup standards are achieved at the point of compliance, Hannah Road. The remedy for the source areas and the groundwater below the sludge lagoon in Zone 1 is being addressed in OU1. OU2 activities include evaluating the effects that may have occurred in the wetland area from the contamination in OU1. The interim remedial action selected in this IROD is applicable to OU3 and will be consistent with any planned future action to the extent possible.

The scope of the problems addressed by the preferred interim remedial action for OU3 will attain the remedial goals established in the February 28, 1994, Dispute Resolution of Initial Screening of Alternatives for Operable Unit Three, Groundwater (Initial Screening of Alternatives [ISA]), at the designated point of compliance.

The ISA defined the point of compliance as Hannah Road. The ISA also documented the standards that would be met for the groundwater at Hannah Road:

- Maximum contaminant level (MCL) and nonzero maximum contaminant level goals (MCLGs) for Providence and Blufftown aquifers
- Ambient water quality criteria (AWQC) for the Quaternary alluvial aquifer

These standards will be referred to as "interim cleanup standards" or "interim remedial goals" in the remainder of the IROD.

The ISA stated that the FS will develop, at a minimum, three options:

- No action
- Pumping at the toe of the landfill
- Pumping at the toe of the landfill and along Hannah Road

#### **5.0 Summary of Site Characteristics**

##### **5.1 Hydrogeology**

Robins AFB lies in the Atlantic Coastal Plain physiographic province. The base is underlain by Cretaceous sediments that are about 350 feet thick. Around Zone 1 and throughout the east side of the base, the Cretaceous sediment is overlain by Quaternary alluvial deposits.

The alluvial deposits consist of a basal sandy gravel bed and an overlying clay bed. The two deposits are each about 7 to 10 feet thick. A swamp established itself on top of the clay bed, creating a 6- to 7-foot bed of peat over the clay. This peat bed forms the uppermost natural



unit in the local stratigraphy and the natural land surface in the swamp. The peat generally is saturated, and the water level within the peat is at or near land surface. The swamp is inundated during flooding by the Ocmulgee River.

The Cretaceous deposits underlying the site are divided into four geologic formations. They are, in descending order, the Providence and Ripley formations, the Cusseta Formation, and the Blufftown Formation. The Providence and Ripley formations are not differentiated in this study because they tend to act as one hydrologic unit. In this FS report, they are referred to as the "Providence Formation."

The Providence Formation underlies the Quaternary gravel bed beneath the east part of the zone and extends upward to the land surface in the west part of Zone 1, where the Quaternary unit pinches out along the west valley wall of the floodplain. The Providence Formation is composed of beds of sand, gravelly sand, silty sand, and clay. For this FS, the Providence Formation was subdivided into upper and lower parts, conforming to the general depths where monitoring wells were completed. The Providence Formation is saturated and yields large quantities of water to wells. A geologic cross section of Zone 1 is shown in Figure 5-1.

The Cusseta Formation is composed of about 15 to 50 feet of dense plastic clay and sand in the vicinity of Zone 1. The unit is saturated but yields little water to wells. Hydrologically, the Cusseta Formation is an aquitard for the underlying Blufftown Formation.

The Blufftown Formation extends from the base of the lowest clay bed in the Cusseta Formation down to the metamorphic basement rocks. The Blufftown Formation consists of saturated sand and gravel beds and yields significant quantities of water to wells. It is the primary aquifer for local water supply. Robins AFB water supply wells are completed in this formation.

The regional or general direction of groundwater flow within the Cretaceous formations beneath Zone 1 is from west to east, generally toward the Ocmulgee River. The entire floodplain of the Ocmulgee River is a discharge area for groundwater. Where the Ocmulgee River has eroded part of the Cretaceous sediment, there is a significant upward gradient from the deeper units toward the shallow Quaternary units and surface water. Outside of the floodplain, there is a generally downward gradient in the Cretaceous deposits, and groundwater recharge occurs. Flow in the near-surface Quaternary units generally is toward the river or to smaller streams in the floodplain. The drainage ditch that forms the north boundary of Zone 1 also acts to control local groundwater flow because shallow groundwater in the area discharges upward into the ditch from both the north and the south.

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## 5.2 Nature and Extent of Contamination

The nature, extent, and concentration of hazardous substances in the landfill and sludge lagoon have been studied in detail in numerous field sampling investigations, which are referenced in Section 2. The primary classes of contaminants present at Zone 1 are metals and volatile organic compounds (VOCs), primarily TCE. The highest relative concentrations of metals and VOCs occur in the sludge lagoon. Maximum concentrations of VOCs and metals in the sludge lagoon were detected in samples collected 8 to 10 feet deep. High concentrations of contaminants also were detected in leachate samples from the sludge in the sludge lagoon. Contaminant concentrations decreased in soil nearer the surface of the sludge lagoon. Another primary source of TCE contamination is the suspected drum-disposal area in the western end of the landfill.

The media of concern in OU3 is the groundwater. For better determining the contaminants of concern in the groundwater four groundwater sampling events were evaluated. The four sampling

events included two sampling events from January-February 1991 and April 1991 that were reported in the OU3 RI report and the two following sampling events, April 1993 and September 1993. The 1991 data are presented in the OU3 RI report, and the 1993 data are presented in the OU3 FS report.

All of the contaminants that were sampled in each of the four sampling events were compared with the interim remedial goals for each of the aquifers. The interim remedial goals are to meet the AWQC in the Quaternary alluvial aquifer and the MCLs and nonzero MCLGs in the Providence and Blufftown aquifers. The interim remedial goals apply to Hannah Road, the point of compliance. For comparison purposes only, Tables 5-1 and 5-2 are presented showing contaminants that have exceeded interim remedial goals anywhere in Zone 1. Table 5-1 presents the contaminants that have exceeded AWQC in the Quaternary alluvial aquifer for all of Zone 1 and the number of exceedances in each sampling event. Table 5-2 presents the contaminants that have exceeded MCLs or nonzero MCLGs in the Upper Providence aquifer for all of Zone 1 and the number of exceedances in each sampling event.

Several observations can be made in reviewing Table 5-1. The total exceedances of the inorganic compounds drops significantly from the 1991 sampling events to the 1993 sampling events. We believe this is primarily due to changes in the sampling protocol, initiated at EPA's direction, but it also may be a result of improving groundwater quality in Zone 1 and changes in procedures. The method for collecting, transferring, and filtering groundwater samples was modified from 1991 through 1993. The method for purging the wells also was modified from April 1993 to September 1993 on the basis of EPA's comments. The change in well-purging protocol decreased the amount of turbidity in the wells at the time of sampling, thus reducing the concentrations of total metals in the samples. We believe that the change in purging protocol allowed collection of samples that are more representative of groundwater quality at the site.

The number of exceedances for organic compounds has been relatively stable over the four sampling events in comparison to the decreasing number of inorganic exceedances. This fact may imply either a stronger organic compound contaminant source load or that the inorganic improvement is strictly due to improved sampling procedures.

Table 5-2 indicates a decreasing trend in exceedances for inorganic compounds, and exceedances for organic compounds have remained roughly the same.

Additional evaluation in the FS focused on the contaminants that exceeded standards on more than one occasion in either of the 1993 sampling events. The 1993 events were used for this criteria because of the changes in groundwater-sampling procedures and because these events reflected the most current conditions in Zone 1. The contaminants of concern that meet this exceedance criteria were copper, lead, mercury, benzene, carbon tetrachloride, tetrachloroethene, trichloroethene, and vinyl chloride.

Contaminants that appear to be associated with a distinguishable plume are lead, carbon tetrachloride, tetrachloroethene, and trichloroethene. On the basis of a review of the physical and chemical characteristics associated with the organic compounds and the averages and ranges of concentrations of these contaminants, the organic contaminant that appears most likely to exceed interim remedial goals at Hannah Road is trichloroethene.

For completing the evaluation of previous groundwater sampling events, Table 5-3 was prepared to present the exceedances that occurred at the point of compliance, Hannah Road, for the sampling events. Table 5-3 indicates that the number of exceedances drops significantly from 1991 to 1993. As with the analysis of all the sampling data above, we believe this is primarily a result of improved sampling procedures and improving groundwater quality.

**Table 5-1**  
**CONTAMINANTS IN QUATERNARY AQUIFER IN ZONE 1 ABOVE AWQC**  
**(Concentrations in : g/L)**

Contaminant	AWQC	Number of Exceedances/Number of Samples by Sampling Event			
		Jan. 1991	April 1991	April 1993	Sept. 1993
Inorganic Contaminants					
Arsenic	0.14	4/24	3/23	0/31	0/31
Cadmium	0.7	2/24	0/23	0/31	0/31
Copper	6.5	16/24	15/23	6/31	8/31
Lead	1.3	22/24	19/23	9/31	3/31
Mercury	0.15	11/24	7/23	5/31	3/31
Zinc	60	10/24	6/23	2/31	0/31
Organic Contaminants					
Carbon Tetrachloride	4.4	10/24	8/24	10/31	10/31
Tetrachloroethene	8.85	6/24	6/24	9/31	8/31
Trichloroethene	81	12/24	10/24	11/31	13/31
Vinyl chloride	525	1/24	2/24	2/31	2/31

**Table 5-2**  
**CONTAMINANTS IN UPPER PROVIDENCE AQUIFER IN ZONE 1 ABOVE MCLs OR**  
**NONZERO MCLGs**  
(Concentrations in : g/L)

Contaminant	MCL, Nonzero MCLG	Number of Exceedances/Number of Samples by Sampling Event			
		Jan. 1991	April 1991	April 1993	Sept. 1993
Inorganic Contaminants					
Antimony	6	NA*	7/21	0/22	0/22
Cadmium	5	1/21	0/21	0/22	1/22
Lead	15	4/21	1/21	1/22	0/22
Nickel	100	0/21	0/21	0/22	1/22
Organic Contaminants					
Benzene	5	0/21	0/21	2/22	1/22
Carbon Tetrachloride	5	5/21	4/21	5/22	5/22
Chlorobenzene	100	0/21	0/21	0/22	1/22
Tetrachloroethene	5	3/21	3/21	2/22	2/22
Trichloroethene	5	8/21	7/21	7/22	8/22

\*NA = Not Analyzed

**Table 5-3**  
**EXCEEDANCES AT HANNAH ROAD**

Well No.	January 1991	April 1991	April 1993	September 1993
Quaternary Wells				
LF4-15		Arsenic		
LF4-15	Copper	Copper		
LF4-15	Dieldrin	Dieldrin		
LF4-15	Lead	Lead		
LF4-15	Mercury	Mercury		
LF4-15		Zinc		
LF4-16		Copper		
LF4-16	Lead			
LF4-17	Cadmium			
LF4-17	Copper	Copper	Copper	Copper
LF4-17	Lead	Lead		
LF4-17	Zinc			
LF4-18		Copper		
LF4-18		Lead		
LF4-19	Copper	Copper		Copper
LF4-19	Lead	Lead		
Providence Wells				
LF4-32		Antimony		
LF4-34	Lead			
LF4-38	Lead		Lead	
TOTAL	13	14	2	2

## **6.0 Summary of Site Risks and Interim Cleanup Objectives**

The current risk for Operable Unit 3 is the potential of contaminated groundwater reaching receptors downgradient of the site and causing adverse health effects. Potential receptors include ecological species in the wetlands due to groundwater discharging to surface water, and humans through the potential ingestion of groundwater or contaminated organisms. The objective of the interim remedial action is to reduce the migration of the contaminants from the site to reduce the risks to potential receptors.

The ISA defined the groundwater point of compliance as Hannah Road and the interim remedial goals as MCLs and nonzero MCLGs for the Blufftown and Providence aquifers and as AWQC for the Quaternary aquifer. The AWQC used were those published in the Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6-03, which were revised on May 29, 1994. In cases when chemicals or compounds are assigned more than one AWQC value in Chapter 391-3-6-03, the lowest value appropriate for freshwater was used. Interim remedial actions will be considered to meet interim cleanup objectives if the interim remedial goals at Hannah Road will be met in the short term and the long term.

## **7.0 Description of Alternatives**

The following is a summary of the alternatives evaluated in the FS for the groundwater in Zone 1, other than groundwater addressed in OU1. These alternatives, which are interim remedial actions, have been evaluated by using a groundwater model. The alternative is considered successful if it results in the interim remedial goals being met at Hannah Road.

The general scope of the alternatives was presented in the ISA. Alternatives 2 and 3 will supplement actions associated with remediating the Zone 1 groundwater at the sludge lagoon, addressed in OU1.

### **Alternative 1: No Action**

The No Action alternative consists of no additional measures for groundwater at Zone 1 other than the measures that will be taken as part of OU1. Therefore, there are no capital or operation and maintenance (O&M) costs associated with this alternative and no implementation schedule as part of OU3.

### **Alternative 2: Extraction of Groundwater at the Toe of Landfill No. 4 and Treatment**

In this alternative, groundwater will be extracted from at least two wells at the toe of Landfill No. 4, treated in a new groundwater-treatment system, and discharged either to the wetlands in Zone 1 or to the Ocmulgee River with other plant effluent. The processes used to treat the groundwater depend on the discharge point. For discharge to the wetlands, filtration, air stripping, or an equivalent VOC treatment method, and ion-exchange technologies will be used. For discharge to the Ocmulgee River, the same technologies except ion exchange will be required. The costs associated with discharging to the Ocmulgee River are as follow:

Estimated Capital Costs: \$1,212,000  
Estimated Annual O&M Costs: \$70,000  
Estimated Present-Worth Costs: \$2,200,000

The costs associated with discharging to the Zone 1 wetlands are as follow:

Estimated Capital Costs: \$6,126,000  
Estimated Annual O&M Costs: \$255,000

Estimated Present-Worth Costs: \$10,046,000

#### Alternative 3: Extraction of Groundwater at the Toe of Landfill No. 4 and at Hannah Road and Treatment

In Alternative 3, groundwater will be extracted from at least two wells at the toe of Landfill No. 4 and one well at Hannah Road, treated in a new groundwater-treatment system, and discharged either to the wetlands in Zone 1 or to the Ocmulgee River with other plant effluent. The processes used to treat the groundwater depend on the discharge point. For discharge to the wetlands, filtration, air stripping, or an equivalent VOC treatment method, and ion-exchange technologies will be used. For discharge to the Ocmulgee River, the same technologies except ion exchange will be required. The costs associated with discharging to the Ocmulgee River are as follow:

Estimated Capital Costs: \$1,526,000  
Estimated Annual O&M Costs: \$81,000  
Estimated Present-Worth Costs: \$2,780,000

The costs associated with discharging to the Zone 1 wetlands are as follow:

Estimated Capital Costs: \$6,732,000  
Estimated Annual O&M Costs: \$270,000  
Estimated Present-Worth Costs: \$10,892,000

### 8.0 Summary of Comparative Analysis of Alternatives

#### 8.1 Overall Protection of Human Health and the Environment

The focus of this IROD is to prevent hazardous substances in groundwater from reaching Hannah Road and causing the interim remedial goals to be exceeded. According to groundwater modeling and the associated assumptions in designing the extraction system, Alternative 2 and Alternative 3 achieve the interim remedial goals of this operable unit for protecting public health and the environment, given proper installation, operation, and maintenance. Protection of the environment and the ecology in the surrounding wetlands from releases of hazardous substances is best provided by Alternative 2 and Alternative 3. The results of groundwater modeling indicate that in Alternative 1 the level of contaminants will exceed the AWQC in the Quaternary Aquifer at the point of compliance in the future.

#### 8.2 Compliance with ARARs

According to the groundwater modeling effort, Alternative 1 will not comply with interim cleanup objectives. Future compliance with ARARs at Hannah Road is based entirely on estimates resulting from the groundwater-modeling exercise for TCE and lead. Alternatives 2 and 3 will comply with the chemical-specific ARAR of meeting AWQC in the Quaternary aquifer and MCLs and nonzero MCLGs in the Providence and Blufftown aquifers at Hannah Road. Each of the alternatives will comply with the permitting and technology requirements of the Federal and State air programs.

As part of each alternative, a National Pollutant Discharge Elimination System (NPDES) permit will have to be either modified or obtained, so this particular chemical-specific ARAR will be achieved in all cases.

Alternatives 2 and 3 will comply with location- and action-specific ARARs, which primarily include wetland and floodplain requirements.

### 8.3 Long-Term Effectiveness and Permanence

This interim action is not designed or expected to be final, but the selected remedy represents the best balance of tradeoffs among alternatives with respect to pertinent criteria, given the limited scope of the action.

### 8.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternatives 2 and 3 should remove approximately the same mass of TCE and other contaminants from the groundwater, given the plume characteristics and the capture zone of the two alternatives. The two alternatives will reduce the toxicity of the groundwater and decrease the TCE mass that will migrate to Hannah Road. Approximately 2,300 pounds of TCE will be removed annually.

Groundwater will be treated on the site in a new treatment facility. Treatment of groundwater will remove contaminants to levels that are in accordance with the NPDES permit before the groundwater is discharged to local surface water.

Treatment for volatiles will be performed by equipment that will be approved during the Remedial Design by the GEPD, U.S. EPA and Robins AFB.

### 8.5 Short-Term Effectiveness

Alternative 2 and Alternative 3 provide short-term effectiveness in that the interim cleanup standard is always achieved at Hannah Road. In Alternative 1, according to the groundwater model, the interim cleanup standard will be exceeded within the next 4 years.

Given the schedule for OU3, the selected alternative is not expected to be implemented until approximately 1997.

The design, construction, and startup of the treatment system probably will take between 1 and 2 years. The design of the treatment system has started already and should be completed no more than 6 months after the signing of the IROD.

### 8.6 Implementability

Each alternative is considered technically and administratively feasible for construction and operation. Commercial services and materials are readily available. Obtaining local permits for implementing the selected remedy is not expected to delay the project.

### 8.7 Cost

The costs for each alternative are presented in Section 7. The assumptions used in developing the cost estimates for each alternative are presented in Appendix B of the OU3 FS report.

The cost estimates have been developed strictly for comparing the three proposed alternatives. The final costs of the project and the resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, the final project scope, the implementation schedule, the firm selected for final engineering design, and other variables. Therefore, final project costs will vary from the cost estimates.

The cost estimates are order-of-magnitude estimates having an intended accuracy range of +50 to -30 percent. The range applies only to the alternatives as they are defined in Section 4 of the FS report and does not account for changes in the scope of the alternatives. Selection of



specific technologies or processes for configuring remedial alternatives is intended not to limit flexibility during remedial design but to provide a basis for preparing cost estimates. The specific details of remedial actions and cost estimates will be refined during final design.

The cost estimates consist of total capital costs, which include the costs of construction, allowances, contingencies, engineering, permitting, and legal advice, and of services during construction and the present worth of O&M costs determined over an appropriate period of up to 30 years at a 5 percent discount rate.

#### 8.8 EPA/GEPA Acceptance

U.S. EPA Region 4 and the Georgia Environmental Protection Division have reviewed and approved the Proposed Plan for OU3 at Zone 1.

#### 8.9 Community Acceptance

The local community has been invited to submit comments and attend a public hearing related to the proposed activities at OU3 at Zone 1. No comments were received during the comment period. Comments from the public hearing and responses to the comments are presented in the "Responsiveness Summary" of this IROD. The comments from the public hearing do not affect the proposed interim remedy at OU3 and were supportive of the proposed actions.

A summary of the comparative analysis presented above for the nine CERCLA criteria is shown in Table 8-1.

Table 8-1 COMPARISON OF ALTERNATIVES AGAINST CERCLA CRITERIA								
CERCLA Criteria								
Cost Alternative		Short-Term	Long-Term	Reduction of Toxicity, Mobility, or	Overall Protection of Human Health and the	Compliance with ARARs	EPA/GEPD	Community
		Effectiveness	Effectiveness	Volume	Environment		Acceptance	Acceptance *
Present								
Present								
Capital	O&M	Worth						
1,								
\$0	\$0		\$0					
2, with discharge to \$1,122,000 Ocmulgee River	\$70,000	% \$2,192,000	%	%	%	%	%	%
2, with discharge to \$6,126,000 Zone 1 wetlands	\$255,000	% \$10,046,000	%	%	%	%	%	%
3, with discharge to \$1,526,000 Ocumulgee River	\$81,000	% \$2,780,000	%	%	%	%	%	%
3, with discharge to \$6,732,000 Zone 1 wetlands	\$270,000	% \$10,892,000	%	%	%	%	%	%

\*Community acceptance will be evaluated on the basis of public comments received on the proposed plan and previous documentation.

## **9.0 Selected Interim Remedy**

The preferred interim remedial alternative for OU3 is Alternative 2, with discharge of the treated effluent to the Ocmulgee River. Although Alternative 2 and Alternative 3 adequately address all of the CERCLA evaluation criteria, Alternative 2 does so at the least cost and therefore is the selected interim remedy. Discharge will be to the Ocmulgee River rather than to the wetlands because of the significantly higher cost of discharging to the wetlands as a result of additional treatment required to meet lower discharge standards. Therefore, the complete preferred interim remedial action includes extracting groundwater from at least two wells at the toe of landfill No. 4, and treatment of the extracted groundwater in a new treatment system, that can meet cleanup standards, and discharge of the treated effluent to the Ocmulgee River. Because the effluent is being discharged to the Ocmulgee River, metals treatment and ion exchange may not be required to meet the permit discharge levels.

### **9.1 Remediation Goals**

The specific objectives of the selected interim remedy are as follow:

1. Control groundwater contamination so that hazardous substances do not exceed interim cleanup standards at Hannah Road.
2. Treat the extracted groundwater to meet required standards for effluent discharge. Removal and treatment of groundwater will reduce the mass of hazardous substances in the groundwater.

## **10.0 Statutory Determinations**

Under its legal authorities, Robins AFB's primary responsibility at this site is to undertake remedial actions that achieve adequate protection of human health and the environment. The statutory determination for this IROD is presented before Section 1. The focus of this IROD is to attain the interim cleanup objectives established at the point of compliance, Hannah Road. The following sections discuss how the selected interim remedy meets these statutory requirements.

### **10.1 Protection of Human Health and the Environment**

The interim remedial goals for the groundwater are stated in the ISA. The evaluation of the Providence and Blufftown aquifers goals is based on protecting human health. The evaluation of the Quaternary alluvial aquifer is based on protecting the environment and protecting humans from the adverse effects of consuming organisms from surface water.

The primary concern related to public health is the potential ingestion of groundwater. The concern applies to groundwater in the Providence and Blufftown aquifers. The specific goals for protecting public health are MCLs and MCLGs.

The interim remedial goal for OU3 for environmental protection is reducing the release of groundwater contaminants so that adverse effects on the wetlands, on the aquatic life, and on human health from organism consumption related to the surface water do not occur. Because groundwater from the Quaternary alluvial aquifer discharges on the site to wetlands or surface water, AWQC are the goals for environmental protection in this aquifer.

### **10.2 Compliance with Applicable or Relevant and Appropriate Requirements**

The selected interim remedy will comply with all ARARs. A detailed discussion of ARARs is

in the OU3 FS. The following were identified as ARARs for Operable Unit 3:

- Ambient water quality criteria as chemical-specific ARARs in the Quaternary aquifer at Hannah Road
- MCLs and nonzero MCLGs as chemical-specific ARARs in the Providence and Blufftown aquifers at Hannah Road.
- RCRA disposal requirements, 40 CFR 264, and land disposal restrictions, 40 CFR 268, are ARARs for groundwater-treatment residuals.
- Clean Water Act requirements for direct discharge of treatment-system effluent (40 CFR 122).
- Georgia Air Quality Act requirements for treatment of air emissions from removal of VOCs from the extracted groundwater.
- Requirements to prevent adverse effects from construction in a 100-year floodplain under Executive Order 11988, 40 CFR 6, and 40 CFR 264.18(b).
- Requirements to minimize destruction, loss, or degradation of wetlands under Executive Order 11990 and 40 CFR 6.

### 10.3 Cost-Effectiveness

The selected interim remedy has been determined to provide overall effectiveness proportional to its costs. The selected interim remedy is protective of public health and the environment and is less expensive than Alternative 3.

### 10.4 Use of Permanent Solutions and Alternative Treatment Technologies (or Resource Recovery Technologies) to the Maximum Extent Practicable

The interim action is not designed or expected to be final, but the selected interim remedy represents the best balance of tradeoffs among alternatives with respect to pertinent criteria, given the limited scope of the action.

Of the alternatives that are protective of human health and the environment and comply with ARARs, Robins AFB has determined that the selected interim remedy provides the best balance of tradeoffs in terms of long-term effectiveness and permanence; reduction in toxicity, mobility, or volume achieved through treatment; short-term effectiveness; implementability; and cost while also considering the statutory preference for treatment as a principal element and considering state and community acceptance.

On the basis of groundwater modeling, Alternative 2 and Alternative 3 are equally effective in the reduction of TCE and lead in groundwater to achieve remedial goals.

### 10.5 Preference for Treatment as a Principal Element

Treatment of the groundwater is a principal element of the selected interim remedy. Because the groundwater is below the source of contaminants, the sludge lagoon, and the landfill, Alternative 2, which includes extraction wells downgradient of the sludge lagoon and the landfill, will be effective in removing and treating the hazardous substances in groundwater in Zone 1 so that interim cleanup objectives are achieved. Therefore, the statutory preference for remedies that use treatment as a principal element is satisfied.

#### 10.6 Documentation of Significant Changes

No significant changes from the Proposed Plan were made.

## **Community Relations Responsiveness Summary**

### **1.0 Overview**

Robins AFB, EPA, and GEPD held a public meeting on May 18, 1995, at the Museum of Aviation to discuss the results of the RI/FS, present the Proposed Plan, and solicit comments and questions from the public.

### **2.0 Summary of Public Comment and Agency Response**

Comments and questions raised during the public meeting held on May 18, 1995, and those received during the public-comment period are summarized below.

1. One resident suggested that the recent flood may have caused contaminants in the upper aquifers to migrate into the lower aquifers. With this possibility, he suggested that the groundwater quality in the different aquifers be restudied. This resident, who is a physician, also expressed a concern about activities using toxic chemicals at the base and their affect on employees. He presented a plaque to the base to be placed near the sludge lagoon to recognize past environmental destruction so that all can learn from these activities.

Robins AFB Response: More than 90 groundwater samples are collected semiannually from different locations and depths in Zone 1. These sampling events will provide information on whether the groundwater conditions in Zone 1 have changed. Regarding his other comments, Robins has an active pollution prevention program to eliminate or reduce the use of toxic chemicals whenever possible and when this is not feasible, wastes will be managed to minimize any releases to the environment. Exposure to chemicals in the sludge lagoon and landfill should not occur because a fence has been installed around these areas. Remediation activities performed in these areas will be conducted by personnel that have received Occupational Safety and Health Act (OSHA) training and have proper personnel protection.

2. One resident asked if methyl ethyl ketone had been discarded in the sludge area.

Robins AFB Response: Methyl ethyl ketone (2-butanone) may have been discharged with other solvents to the sludge lagoon prior to 1978. Of the 88 groundwater samples collected in spring 1993, two samples contained methyl ethyl ketone. None of the groundwater sampled collected in fall 1994 contained methyl ethyl ketone. Any residual methyl ethyl ketone remaining in Zone 1 is within the capture zone of the groundwater removal system.

3. One resident added that the concern is the vinyl chloride at the bottom of the sludge lagoon.

Robins AFB Response: Vinyl chloride has been detected in the groundwater at Zone 1, but with less frequency than detection of trichlorethene. The vinyl chloride in the groundwater is within the capture zone of the groundwater removal system.

4. One resident asked about the quality of the water that will be discharged from the groundwater treatment system.

Robins AFB Response: The discharge will meet the present National Pollutant Discharge Elimination System (NPDES) permit limits. The base will not be asking for any changes to the permit.

5. One resident asked about the fishing problem and if this was related to mercury.

Robins AFB Response: Robins intends to comply with its NPDES permit. Compliance with this permit is the procedure EPA, EPD, and the base follow to provide protection to human and ecological receptors.

6. One resident, another physician, commented that except in an isolated case of workers climbing into fuel tanks, he has not had patients that had pathological effects from chemicals handled at Robins. He also commended Robins on their restoration activities and progress.

4WD-FFB

CERTIFIED MAIL  
RETURN RECEIPT REQUESTED

Major General William P. Hallin  
Commander  
215 Page Road  
Suite 232  
Robins Air Force Base, Georgia 31090-1662

SUBJ: Interim Record of Decision for Operable Unit Three  
(ground water) Robins Air Force Base NPL Site  
Warner Robins, Georgia

Dear Major General Hallin:

The U.S. Environmental Protection Agency (EPA) has reviewed the above referenced decision document and concurs with the selected interim remedy for remedial action at Operable Unit Three, as supported by the previously completed Remedial Investigation and Feasibility Study.

The selected interim remedy is to install extraction wells into the Quaternary and Upper Providence aquifers, and treat the ground water to remove organics to meet the limits in the NPDES Permit. EPA understands that Robins Air Force Base and GA EPD have agreed that the NPDES Permit may require treatment of metals. The treated water will be discharged to the Ocmulgee river in accordance with an NPDES permit. This interim remedial action is protective of human health and the environment, complies with Federal and State requirements for an interim remedy and is cost effective.

It is understood that the selected remedy for Operable Unit Three is an interim remedy and that a final remedial action will be proposed for this site.

Sincerely,

<IMG SRC 0495258D>

Patrick M. Tobin  
Deputy Regional Administrator

cc: William Downs, RAFB  
Danny Heater, GA EPD  
Bobby Ficquette, AF